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CHEMICAL & ENGINEERING

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INSTRUMENTATION '85

Hardware, software trends from the Pittsburgh Conference Page 29

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■ **Although it accepts the nuclear winter theory, DOD says that will not affect present policy on preventing nuclear war.** **Page 7**

■ **C&EN senior editor wins George Polk Award for special interest reporting.** **Page 7**

■ **Researchers determine structure of supersweet protein.** **Page 7**

■ **Union Carbide no longer will ship methyl isocyanate in that form when it reopens Institute Plant.** **Page 8**

■ **EPA rules cut lead in gasoline to 0.1 g per gal by Jan. 1, 1986.** **Page 8**

Business

Wall Street analysts see the Chesebrough-Stauffer merger as protective measure by two firms vulnerable to takeover. **Page 10**

Worldwide production of man-made fibers reached an all-time high last year at 33.6 billion lb but U.S. share declined. **Page 11**

Government

NSF sets up national supercomputer centers at four universities as nucleus of a nationwide scientist/engineer network. **Page 14**

FDA's plan to shorten review time on new drug applications would make therapeutics available faster, cut down paperwork. **Page 16**

Science

National Science Foundation's decision to drop its program on ethics in science and technology meets criticism. **Page 19**

Education

Institutes for science teachers held by the University of California, Irvine, aim to improve instruction, curricula. **Page 22**

Books

"Modern Meat" by Orville Schell explores the use of drugs in farm animals and the drugs' potential danger to humans. **Page 80**

Cover: Photo by C&EN's Stephen C. Stinson

Instrumentation '85

Automation to boost productivity in the analytical lab was much in evidence at the Pittsburgh Conference, held in New Orleans' new convention center. **Page 29**

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chemicals division and especially of Stauffer's understanding of its markets in the agricultural chemicals business and of the economics of the farm markets into which the company has been selling.

Part of the problem with the company's pesticide unit—whose sales in the 1984 fiscal year ended last Sept. 30 were 17% below 1980 sales—was outside Stauffer's control and had to do with weather and the government's payment-in-kind crop set-aside program. But analysts say that Stauffer, which thought it could fix much of the company through the agricultural chemicals unit, missed an important concept of farm economics—namely, how the farmers would cultivate the soil. When the market was moving toward no-till and minimum-till planting, Stauffer was selling preplant incorporated herbicides, which increase, rather than decrease, the number of trips the farmer has to make through his field. In spite of increased use of herbicides in reduced tillage practices, most of the increase is in post-emergent products, where Stauffer is weak. "The company essentially was trying to sell last year's product into this year's market," says one analyst.

The one product that the company has as a hope in the new agricultural environment is Touchdown, a glyphosate herbicide designed to compete with Monsanto's Roundup. However, Stauffer is involved in patent litigation with Monsanto in the U.S. and abroad, and the outcome of this is likely at least two years away. Even if Touchdown makes it through the court battles, according to one analyst, Stauffer will not be able to get the share of market that it would like to have, and it probably cannot expand the market any more. "So Touchdown could be a nice product," he says, "but it's not going to be a $250 million per-year product."

Analysts say that Morley began to take steps to repair the company, except for agricultural chemicals, about three years ago. One, for instance, gives him credit for getting rid of some problem businesses. But, he says, because of two years of indecision prior to that, the timetable for when Stauffer would be a great company was pushed back. And it went off in a lot of different directions—biotechnology, oil and gas, and diagnostics—because those areas sounded good. Some of the areas that Stauffer got into look interesting, but there are five- or 10-year payoffs for them.

Just what Stauffer is going to do for Chesebrough is open to question, also. One analyst says that Stauffer had been looked at by chemical companies that decided that the problems were just too great to justify the price tag. But, he says, a chemical company could have cut costs significantly because of duplication of services. Chesebrough, according to him, comes in with no expertise in chemicals and has no management to bring to it and no way to cut costs because there is no duplication. "There is zero synergy," he says. "It is just the wrong company to buy Stauffer at this time."

Others are not so uncharitable, however. They point out that although there are big problems in the agricultural chemicals and fabricated products units, there are highly profitable parts of the chemicals business, such as sulfuric acid reprocessing, and of the specialties unit, such as silicones. Also, according to one analyst, there is great potential in phosgene-based specialties. He adds that this could be scary for Chesebrough, however, in the aftermath of Union Carbide's Bhopal accident, which involved methyl isocyanate, a phosgene-related chemical.

Finally, one analyst says that ultimately the acquisition could be cheap for Chesebrough. If the company could sell off the agricultural chemicals business (though Ward has said he will not sell off any part), it probably could get about $500 million for it. Add to this some internal cash realized through accounting changes and other sources of which Chesebrough will be the beneficiary, and the cost comes out to hundreds of millions of dollars rather than the $1.25 billion that Chesebrough will be paying.

William Storck, New York

Global man-made fibers output hits record high

Production of man-made fibers throughout the world last year was the highest ever. It amounted to 33.6 billion lb, more than 3% ahead of 1983. This fiber grouping includes not only those fibers made entirely by chemical syntheses but those, such as rayon, that involve considerable processing of natural cellulose into fibers.

This all-time record was achieved through synthetic fibers growth. According to the latest annual survey of the global industry compiled by analysts at Enka, the fibers-producing arm of Akzo of the Netherlands, synthetics accounted for almost 79% of world output, accounting for 26.5 billion lb. Cellulosics, output of which has been declining for some years, contributed the remaining 21% of global production, or 7.2 billion lb.

Growth of synthetics at the expense of cellulosics is more evident when last year's figures are compared with those of 1975. In that year, with total output amounting to 23.5 billion lb, synthetics accounted for 70% (16.4 billion lb) and cellulosics 30% (7.1 billion lb). Since 1975, synthetic fibers production has increased at an average annual rate of 5.5%, whereas cellulosics output has remained essentially static.

On a regional basis, the U.S. continues to lead in synthetic fibers output. Last year, it held a 26% share of the world total (almost 7 billion lb), followed by Western Europe with 20% (5.4 billion lb), and Japan with almost 12% (3.1 billion lb). The rest of the world lumped together accounted for nearly 42% of the total, or about 11 billion lb.

There is little room for complacency as far as the U.S. is concerned, however, since its share of overall output continues to decline, as it also has been doing for Western Europe and Japan. In 1975, the U.S. produced 34% of the world synthetic fibers total (5.5 billion lb), Western Europe 25% (4.1 billion lb), and Japan 14% (2.3 billion lb). All other countries combined produced the

Global man-made fibers production in 1984 reached 33.6 billion lb . . .

. . . owing to an increase in synthetics production

balance of almost 28% of the world total, or 4.5 billion lb.

Viewed in terms of average annual growth, synthetic fibers output in the U.S. has grown 2.6% annually since 1975. In both Western Europe and Japan it has increased 3.2% a year. But in the rest of the world, annual growth has exceeded 10%. Indeed, synthetics output in the U.S. last year was unchanged from 1983. For man-made fibers as a whole, growth in the U.S. was a mere 0.2% to a little more than 8 billion lb.

Worldwide output in 1984 of the three broad classes of synthetic fibers—acrylics, polyamides, and polyesters—advanced an average of about 4% from its 1983 level. Acrylics production rose 3.9% to 5.02 billion lb, polyamides 3.1% to 7.3 billion lb, and polyesters 4.7% to 12.8 billion lb. Production of fibers from polypropylene, polyvinyl chloride, elastomerics, and the like, grouped together as "others," advanced 7.1% to 1.4 billion lb.

The relative proportion of the fiber types made, on the other hand, remained the same as in 1983—19% acrylics, 28% polyamides, 48% polyesters, and 5% others. And this ratio was essentially unchanged from the 1980 profile, apart from the other fibers, which collectively gained 1% of the total at the expense of a corresponding drop in polyamides.

More significant is the comparison with the 1975 production split. In that year, acrylics still accounted for 19% (3.1 billion lb), whereas polyamides amounted to 34% (5.5 billion lb), and polyesters 45% (7.4 billion lb). Other fibers accounted for only about 3% of output (440 million lb).

Between 1975 and 1984, output of the "other" fibers spurted at more than a 13% annual growth rate, for an absolute gain of 209%. That compares to an average annual growth rate for polyesters of 6.3% (up 73% for the decade), acrylics 5.7% (up 65%), and polyamides 3.2% (up 33%). During that period, synthetic fibers production's 5.5% annual growth rate resulted in a decade gain of 61% to 26.5 billion lb.

Polyester retains its pride of place among synthetic fibers. It also has been undergoing the fastest rate of growth. Last year's 12.8 billion lb of output accounted for more than half the global production of the three major fiber categories, with the balance split between polyamides at 29% and acrylics at 20%. The 1975 profile stood at 46% polyester (7.4 billion lb), 35% polyamides (5.5 billion lb), and 19% acrylics (3.1 billion lb). As for average annual growth rates during the nine-year span, polyester led with 6.2%, followed by acrylics' 5.7%, and polyamides' 3.2%.

Regional results for polyester last year varied widely. In the U.S., polyester fiber production declined 3% from 1983 to 3.5 billion lb. In Japan it gained 2% to 1.4 billion lb. And in Western Europe it rose 8% to 1.9 billion and in other regions of the world it gained 7% to 6 billion lb.

The U.S. fared a mite better in acrylics and polyamides, with a 1% gain in each to 650 million and 2.42 billion lb, respectively. Acrylics production increased 3% in both Western Europe (to 1.7 billion lb) and Japan (to 800 million lb), and in the rest of the world it rose 4% to 1.9 billion lb. Polyamides production in Western Europe last year increased 2% to 1.3 billion lb; in Japan it rose 4% to 660 million lb, and in the other world regions it surged 9% to 2.9 billion lb.

For 1985, Enka market analysts foresee a number of conflicting trends that will have positive and negative impacts on the fibers business. They believe, for instance, that the upswing in the world economy will continue. However, if growth in the U.S. levels off, "the increase in world trade probably will remain below that of the previous year."

As regards Western Europe, "a high sales volume for the man-made fibers industry is anticipated, at least for the first half of 1985." Exports will continue to be the mainstay of economic growth. On the other hand, much will depend on the movement of the U.S. dollar in relation to other major currencies. Last year, its strength helped spur sales of European goods in dollar trading areas. □

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Inorganic Macromolecules

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FINAL PROGRAM
ACS spring meeting,
Miami Beach Page 37

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News of the Week

■ **NBS physicists have used laser light to slow down neutral atoms, allowing them to be better observed.** **Page 4**

■ **Antinausea drug Bendectin has been cleared of charge that it causes birth defects.** **Page 5**

■ **Panel charged with reviewing U.S. chemical warfare capability and policy begins work.** **Page 5**

■ **Department of Energy's plan for nuclear waste disposal draws fire from Office of Technology Assessment, which offers its own plan.** **Page 6**

■ **EPA is reconsidering its decision to refer proposed asbestos ban to other agencies.** **Page 6**

Cover: Oriented, flexible film of poly[bis(trifluoroethoxy)phosphazene], or $[NP(OCH_2CF_3)_2]_n$

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Business

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International Business

Arco Chemical Europe, feeling expansive, reveals plans to build plants in France and the Netherlands. **Page 10**

Government

Department of Defense argues for binary chemical arms, insisting they are needed for credible deterrent. **Page 13**

Agricultural research establishment gets more advice; report from NRC spotlights areas for change. **Page 14**

Debate surrounds budget cuts for research and development on fossil energy sources. **Page 16**

Science

Chemists modify FTMS and show high-resolution spectra, efficiencies, and separation speeds. **Page 18**

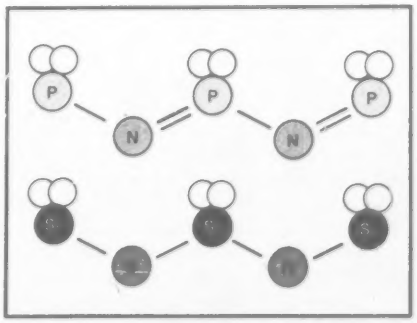
International team of physical chemists comes up with equation to predict solubility of any compound in any solvent. **Page 20**

Final Program

Complete technical program given for 189th ACS National Meeting to be held in Miami Beach April 28 through May 3. **Page 37**

ACS News

Policy statements issued by ACS on three different government matters concerning chemists. **Page 109**



Special Report

New high-molecular-weight polymers that contain inorganic elements in their backbones are eyed for use as high-tech materials, electrical conductors, and biomedicals. **Page 22**

Chemical Industry Cool to Prospects For Increased Trade with Soviets

Administration's attempts to improve trade relations with U.S.S.R. probably won't increase currently small volume of chemical trade

The Reagan Administration is sending out signals that it wants to improve trade relations with the Soviet Union. But the U.S. chemical industry so far is remaining cool to these prospects.

Earlier this year, Lionel H. Olmer, the Commerce Department's undersecretary for international trade, met with his Soviet counterparts in Moscow. He is the highest-ranking U.S. trade official to visit Moscow since the Carter Administration days.

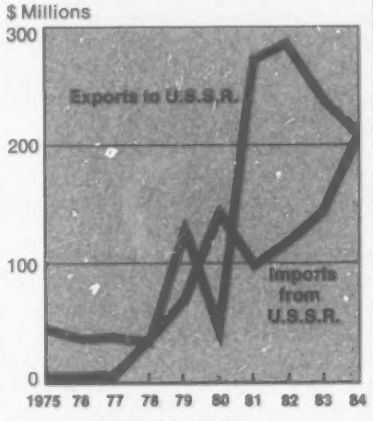
The Reagan Administration also has proposed a meeting of the U.S.-Soviet Commercial Commission, a Cabinet-level group that monitors U.S.-Soviet trade. The commission hasn't met in six years. U.S. officials are hoping for a late spring meeting in the U.S.S.R., but so far the Soviets haven't responded to the U.S. proposal.

These first steps toward improved trade relations between the two countries certainly offer no guarantees. But they are welcome news nonetheless to many U.S. business interests, especially agriculture, that hope to benefit from increased sales to the Soviets.

The chemical industry, however, isn't particularly enthusiastic or optimistic. According to one industry trade expert, the prospect of improved trade relations between the U.S. and the U.S.S.R. "is no big deal" for U.S. chemical companies. He doesn't anticipate any "big push" on their part to increase chemical exports to the Soviet Union.

There may be a few isolated exceptions to that assessment. A U.S. government trade official says that he has detected some interest among exporters of plastics and agricultural chemicals to gain a foothold in the Soviet market. But for the most part, trade with the Soviets will remain well down the list of the chemical industry's international problems.

U.S. chemical trade with U.S.S.R. small but growing



Source: U.S. Bureau of the Census

Last year, chemical exports to the U.S.S.R. accounted for less than 1% of total chemical exports. Soviet chemicals amounted to only 1.5% of the U.S. chemical import total. So even if chemical trade in both directions were to increase substantially on a percentage basis, it still would represent only a small portion of overall U.S. chemical trade.

Chemical exports to the Soviet Union in 1984 amounted to $208 million. Although that figure is much higher than the $30 million to $40 million level that prevailed in the late 1970s, it marks the second successive year in which chemical exports to the Soviets declined. In 1982, they hit $288 million.

Another significant aspect of U.S. chemical exports to the U.S.S.R., in addition to the small volume, is their composition. Last year, almost 90%,

U.S.-U.S.S.R. chemical trade was in balance last year

	Exports to U.S.S.R.		Imports from U.S.S.R.	
$ Millions	1983	1984	1983	1984
Organic chemicals	$ 0.4	$ 3.6	$ 2.0	$ 12.0
Inorganic chemicals	223.9	189.0	88.0	141.7
Radioactive materials	0	0.3	9.9	0.2
Dyeing, coloring & tanning materials	neg	0	0	0
Pigments, paints & varnishes	3.5	2.9	0	0
Medicinals & pharmaceuticals	1.0	1.3	neg	neg
Flavor, perfumes, cosmetics & toiletries	neg	neg	neg	neg
Cleaning & polishing materials	neg	neg	0	0
Fertilizer, manufactured	2.9	0	43.0	53.7
Explosives & pyrotechnics	0	0	0	0
Plastics & resins	1.7	3.1	neg	0
Pesticides & disinfectants	0.7	1.7	0	0
Miscellaneous	5.3	3.2	0.8	0.2
TOTALS	$239.4	$208.1	$143.8	$207.8

neg = negligible. Source: U.S. Bureau of the Census

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or $186 million, was accounted for by fertilizer-grade phosphoric acid, reflecting the now-famous barter deal that Occidental Petroleum chairman Armand Hammer negotiated with the Soviets. The slim $22 million remainder was split among small volumes of paints and pigments, medicinals, some plastics, and a host of miscellaneous chemicals.

Unlike chemical exports, chemical imports from the U.S.S.R. have been increasing over the past few years. They have grown from $94 million in 1981 to $208 million last year. By comparison, they were only a miserly $6 million in the mid-1970s.

More important, that value of chemical imports from the Soviets means that U.S.-Soviet chemical trade was in balance last year. With very few exceptions, the U.S. has enjoyed a chemical trade surplus with the U.S.S.R. for years.

Despite this achievement, chemical trade between the U.S. and the U.S.S.R. is not much more significant to the Soviets than it is to the U.S. United Nations statistics, which detail complete chemical trade flows throughout the world, tell the story. In 1982, the latest year for which complete statistics are available, the U.S.S.R. exported $2.35 billion worth of chemicals. The $118 million that it shipped to the U.S. that year represented only 5% of the total.

The U.S.S.R. does rely on western nations for much of its chemical export business, but the primary target is Western Europe. In 1982, for instance, 35% ($823 million) of its chemical exports went to western, developed nations. Western Europe took 80% of that amount.

The Soviet Union imported twice as much chemicals ($4.7 billion) as it exported in 1982, but the geographic distribution is similar. Western and Eastern European countries are the dominant suppliers, with the East holding a slight edge. The U.S. accounted for only 6% of Soviet chemical imports.

Thus, U.S.-U.S.S.R. chemical trade represents only a small slice of the pie for both countries. And even if a thaw does materialize in U.S.-Soviet trade relations, its impact on the overall chemical trade picture is not likely to be significant.

Earl Anderson, New York

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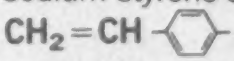

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